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except that, on account of the hulls, oats and barley should be soaked longer.—E. A. SOUTHWORTH.

BOLLEY, HENRY L. *The Heterœcismal Pucciniæ.* American Monthly Microscopical Journal, Vol. X, 1889.

The author of this paper starts with a general account of the biology and classification of the *Uredineæ*, gives a short description of the internal arrangement of the order, as well as its position among the fungi, and a definition of *heterœcism*, ascribing as a cause "inherent wants of the parasite not to be satisfied by one of its hosts alone," rather than to any difficulty which the promycelia might find to an entrance into the host tissue. Taking up the mycelium, a short description is given, with a belief that there are no true haustoria, but that young mycelial threads, penetrating the cell walls, give the misleading appearance. The article treats of æcidia and spermogonia at some length, without, however, attempting to clear up the mystery of their designed use. Under the account of the teleutospore, a doubt is expressed in regard to the existence of the so-called germ-pores. The author finds in the process of germination, instead of the passage of a germ-tube through a previously formed canal, a gradual erosion of the endospore from within. In regard to the question of sexual or non-sexual reproduction in the order, the work of Dr. George Massee is criticised, claim being made that the stroma, which bears ultimately the æcidial spores, does not consist, as figured by the latter, of a stalked body, but of a mass of interlaced hyphæ—branches and extensions of ordinary hyphæ. In the cases studied by Mr. Bolley *Æ. berberidis* and *Æ. hepaticarum*, the basidia arise as bud-like branches from individual hyphæ without any characteristics of a sexual process, and the author coincides with H. Marshall Ward in the thought that this process has disappeared, not being longer needed by the fungus.—D. G. FAIRCHILD.

FARLOW, W. G. *Notes on Fungi.*. Botanical Gazette, August, 1889.

In the last number of the *Botanical Gazette* Dr. Farlow gives an account of a *Cystopus* causing peculiar swellings on the stems of *Ipomœa pandurata*, sent him by Prof. L. H. Pammel from Missouri. It appears from the note that the form of *Cystopus* upon the *Convolvulaceæ* of the United States has hitherto been found wanting in oospores, raising the question whether or not it should be united under *C. cubicus* (Strauss), Lév., which inhabits the *Compositæ.* The specimens sent by Professor Pammel seem to have abounded in peculiar oospores. The oogonia also differed from those of others of the same genus, in having their walls raised in blunt papillæ or short flexuous ridges over the whole surface. Differing as it does in oogonia and oospores from *C. cubicus*, the author thinks it clearly can not be placed under it. The name *C. convolvulacearum*, Otth, used by Kellerman and Ellis, is considered, after correspondence with Dr. Fischer, of Berne, as only a manuscript name used by

Otth and first published by Zalewski, in 1883; which latter authority for *C. convolvulacearum* is consequently preferred, but the author considers the Schweinitzian name *Æcidium ipomϾ-panduranæ*, given in 1822, as the first name applied to the form on *Convolvulaceæ* in North America.

Mention is made in the same paper of a very interesting *Peronospora*, found to agree with *P. Cubensis*, B. & C., which has been found independently in Cuba, Japan, and New Jersey, in which latter place it has attacked most vigorously the cucumber vines. It is especially interesting biologically as an exception to the general rule that only small conidial spores produce zoospores.—D. G. FAIRCHILD.

CAVARA, DR. F. *Materiaux de Mycologie Lombarde*, Revue Mycologique, October, 1889.

The author gives a list of the fungi of Lombardy, the following orders being represented: *Myxomycetes*, 4; *Zygomycetes*, 4; *Oomycetes*, 12; *Ustilagineæ*, 4; *Uredineæ*, 11; *Discomycetes*, 12; *Pyrenomycetes*, 33; *Hyphomycetes*, 44; *Sphæropsideæ*, 41; *Leptostromaceæ*, 4; *Melanconeæ*, 13; Imperfect forms, 3. Fifteen of the species are new and are fully described and illustrated by two plates. There are also many interesting notes on some of the injurious species.—B. T. GALLOWAY.

FULTON, T. WEMYSS. *The Dispersion of the Spores of Fungi by the Agency of Insects, with Special Reference to the Phalloidei.* Annals of Botany, May, 1889, p. 207.

This interesting article may be divided into two rather distinct parts, the first comprising the results of Mr. Fulton's experiments with *Phallus impudicus*, and the second containing data gathered from different sources to prove that the adaptation of fungi for the visitation of insects is quite general among certain families.

After a description of the structure and development of the common Stinkhorn (*Phallus impudicus*), attention is drawn to the fact, noticed previous to 1575, that the liquefied hymenium, or stinking slime, of this species has great attractions for insects, especially two species of fly, *Musca vomitoria* and *Musca Cæsar.* To settle two important questions suggested by these insects feeding upon the slime filled with the ripe spores of the fungus, the effect of the slime upon the fly and the effect of the fly upon the spores, the author conducted two series of experiments. The first series, involving the first question, proved, as might be expected, that the slime has no effect upon the fly either before or after death. The second series, consisting in an attempt to produce the fungus from spores which had traversed the digestive organs of the fly, was measurably successful, although slightly incomplete, from the fact that only two out of four trials produced the characteristic mycelium, and of these, the one given an opportunity to develop its compound sporophore failed to do it. The author does not mention in his account of the experiment any attempt to free the excrement from